UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,820	10/24/2003	Chester Ledlie Sandberg	5659-20900/EBM	1426

7590 07/27/2007

DEL CHRISTENSEN
SHELL OIL COMPANY
P.O. BOX 2463
HOUSTON, TX 77252-2463

EXAMINER	
PAIK, SANG YEOP	
ART UNIT	**PAPER NUMBER**
3742	

MAIL DATE	DELIVERY MODE
07/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/693,820	SANDBERG ET AL.	
	Examiner	Art Unit	
	Sang Y. Paik	3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1691-1747* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1691-1747* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/5/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1691-1697, 1699-1717 and 1719-1747 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eastlund et al (US 4,716,960) in view of Rose (EP 0130671).

Eastlund shows the system claimed including a heater well extending into a hydrocarbon formation, a heating element located in the heater well and transfer heat from the heating element to hydrocarbons such the paraffin deposited in the heater well, and an AC supply with a voltage above about 200 volts. Eastlund further shows the heating element having a copper inner core with a steel outer conductor, but it does not explicitly show that such steel outer conductor is ferromagnetic.

Rose shows a heating element having an inner core made of copper with an outer conductor made of a ferromagnetic carbon steel which allows the heating element to be self-regulating. Rose further discloses that its heating element is configured such that the heater automatically reduces its heat output near or above a selected temperature including the Curie temperature of about 760 °C.

In view of Rose, it would have been obvious to one of ordinary skill in the art to adapt Eastlund with the heating element shown in Rose to provide a self-regulating heating element to more conveniently maintain a desired heating temperature.

Regarding the recited mobilized or pyrolyzed hydrocarbons, such hydrocarbons would have been inherently achieved with the heating element of Eastlund which also provides the heat as does the claimed system.

Regarding claim 1711, the limitation that the selected temperature is "within about 50 °C of the Curie temperature of the ferromagnetic material" fully reads on Rose since the selected temperature disclosed in EP130671 (i.e., the Curie temperature) falls within the claimed range.

Regarding claims 1699 and 1719, Rose discloses a number of different iron-nickel alloys with varying Curie temperatures suitable as ferromagnetic materials for autoregulating electric heaters. See P. 14, Table I (noting that iron-nickel alloys have relatively lower Curie temperatures compared to other ferromagnetic materials).

Regarding claim 1700 and 1742, see P. 9, lines 24-26 of Rose.

Regarding claim 1702 and 1722, see P. 6, lines 24-28 of Rose.

Regarding claim 1744, because (1) the heater of Rose utilizes the skin effect of the conductor to ultimately dictate its heating, (2) the inverse relationship between frequency and skin depth is well known (see P. 2, lines 11-28), and (3) a wide frequency range of 50 Hz - 10 KHZ is envisioned (see P. 8, line 19-23), the heater of Rose would inherently control the skin depth in the conductor by varying the applied frequency.

Regarding the recited values of the amps or current, the reduced heat above or near the selected temperature and the turndown ratio, since no criticality is seen in these specific values and since such specific values claim optimized result-effective variables, it would have been obvious to one of ordinary skill in the art to include such values in operating the heating system as being well within the scope of routine experimentation by skilled artisans depending on the

desired temperature and heat output. It is well settled that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 456, 105 USPQ 233,235 (CCPA 1955).

3. Claims 1698 and 1718 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eastlund in view of Rose as applied to claims 1691-1697, 1699-1717 and 1719-1747 above, and further in view of Bridges et al (CA 2,151,521).

Eastlund in view of Rose shows the system claimed except for a three-phase power source. But powering a downhole ferromagnetic electric heater with a three-phase power source is well known in the art as evidenced, for example, by Bridges noting Figs. 11 and 12 and P. 32, line 11 - P. 35, line 21. As is well known in the art, three phase loads take advantage of the higher voltage and power level associated with three-phase power distribution. In view of Bridges, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a three-phase power source in the previously described system to take advantage of the higher voltage and power Level associated with three-phase power distribution.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting

ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1691-1747 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1691-1743 of copending Application No. 10/693,700 or claims 1691-1753 of Application No. 10/693,840. Although the conflicting claims are not identical, they are not patentably distinct from each other because the copending claims include the recited system including a heater well, an AC supply, one or more electrical conductors comprising a ferromagnetic material in the heater well for heating the hydrocarbon formation except for the AC supply providing a voltage above about 200 volts. But since the voltage is proportionally related to the desired heating output, it would have been obvious to provide the voltage at the recited volts or any other volts to achieve a corresponding heating output, i.e., higher the output higher, the voltage desired.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

6. Applicant's arguments filed 5/11/07 have been fully considered but they are not persuasive.

The applicant argues that the heaters in Eastlund are not used to transfer heat into any portion of any hydrocarbon containing layer, and Eastlund does not make reference to extending the heaters into any hydrogen containing layer. The applicant further argues the heaters of

Eastlund, producing low degrees of heating, are used to prevent solids formation in the wellbores but are not used to mobilize any hydrocarbons. It is noted that the recitation regarding the hydrocarbons in the hydrocarbon containing layer goes to the materials that is worked upon by the claimed apparatus system and such materials do not determine the patentability of the apparatus. See MPEP 2115. Furthermore, the such recitation goes to the intended function or manner of the device wherein the manner of operating the device does not differentiate the apparatus claim. See MPEP 2114. Also, since Eastlund, as modified by Rose, shows the claimed elements of the system, it is also capable of performing the method of heating including the method of mobilizing the hydrocarbons.

The applicant argues Eastlund teaches low degree of heating, about 73-85 degrees in Fahrenheit, wherein such heating is not sufficient to mobilize any hydrocarbons in the hydrocarbon containing layer. This argument is not deemed persuasive since such temperature relates to the temperature of the sub-formation at 200-300 ft below but not the heating capability of the heater. Eastlund which has the heating output of 5000 to 13,600 watts has the capability of producing more than 73-85 degrees in Fahrenheit in order to produce the temperature of the sub-formation at 200-300 ft below at 73-85 degrees in Fahrenheit. The applied Rose reference also shows that it is known for a ferromagnetic heater to have the heating output capability of producing the Curie temperature up to 760 degree in Celsius.

The applicant, however, argues Rose teaches away from the combining the references because the heater in Rose is in a "relatively small device" and that there is no mention of its use in wells or for hydrocarbons. This argument is not deemed persuasive. The heater of Rose is in the same field of endeavor which is in the field of ferromagnetic heater known for its self-

regulating capabilities, and Rose is in the same field of endeavor with Eastlund and as well as in the applicant's field of endeavor wherein the issue of self-regulating heating capability of a heater is also reasonably related to the problem which the applicant was also concerned of. While Rose does not explicitly discloses for heating hydrogen carbons in the hydrogen carbon containing layer, Rose, as modified with Eastlund, is capable of heating such materials having the substantially same structure as that of the claimed system.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Y. Paik whose telephone number is 571-272-4783. The examiner can normally be reached on M-F (6:30-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on 571-272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

S.R

Sang Y Paik
Primary Examiner
Art Unit 3742

syp